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PLANETARY PHENOMENA FOR JULY AND AUGUST, 1920

BY MALCOLM MCNEILL

PHASES OF THE MOON, PACIFIC TIME

Full Moon......	July	1,	12^h41^m	A.M.
Last Quarter....	"	8,	9 6	P.M.
New Moon......	"	15,	12 25	P.M.
First Quarter....	"	22,	11 20	A.M.
Full Moon......	"	30,	3 19	P.M.
Last Quarter.....	Aug.	7,	4^h51^m	A.M.
New Moon......	"	13,	7 44	P.M.
First Quarter....	"	21,	2 52	A.M.
Full Moon.......	"	29,	5 3	A.M.

The Earth is in aphelion July 4th, 4 A. M., Pacific Time.

Mercury is an evening star on July 1st, setting about an hour and one-half after sunset, and therefore in good position for evening observation; but it has already passed greatest elongation and is approaching conjunction with the Sun, so it will be observable for only a few days. Inferior conjunction comes on July 26th, the planet becoming an evening star. It now moves out toward greatest west elongation, 18°44′, reaching this on August 14th. It then rises about an hour and one-half before sunrise and is easily visible for a few days; but its distance from the Sun soon begins to diminish rapidly so that by the end of August it has nearly reached superior conjunction. It is in conjunction with *Venus* on July 22nd, with *Neptune* on August 21st and with *Jupiter* on August 31st, but for all three the planets are too near the Sun for easy visibility.

Venus passes superior conjunction with the Sun at noon, July 3rd, Pacific Time, becoming an evening star and remaining such for nearly ten months, or until April 22, 1921. It passes its perihelion on July 21st, but its orbit is so nearly circular that the variation of its motion due to changing distance from the Sun is very slight, a marked contrast in this particular to *Mercury* and *Mars*. After passing conjunction the planet drifts away from the Sun very slowly so that even by the end of August the planet sets only a little more than half an hour after sunset, and will not be an easy naked-eye object even tho it is two magnitudes brighter than *Jupiter*, the next brightest one of the heavenly bodies. It is in conjunction with *Mercury* on July 22nd, with *Neptune* on July 27th, with *Jupiter* on August 8th and with *Saturn* on August 22nd.

Mars is still a rather conspicuous object in the southwestern evening sky altho its apparent distance from the Sun is gradually lessening. On July 1st it sets somewhat after midnight and on August 31st somewhat before 10 P. M. During the two months' period it moves 31° eastward and 10° southward from a position a little east of *Spica*, *α Virginis*, into *Libra*. Its actual distance from the Earth in miles is beginning to grow larger rapidly and increases from 79 million miles on July 1st to 113 millions on August 31st. On July 26th its distance is equal to that of the mean distance of the Earth from the Sun. The increasing distance causes the brightness to diminish more than one-half, but it will still be brighter than all except three or four of the brighter stars at the end of August.

Jupiter is no longer in very good position for evening observation as its apparent distance from the Sun is growing less. It passes conjunction with the Sun on August 21st, becoming a morning star. On July 1st it sets a little more than two hours after sunset; but this interval diminishes to less than one hour before August 1st and disappears entirely at conjunction. It can probably be seen by the naked eye thru the greater part of July, but after August 1st it will not be easily made out.

Jupiter will be in conjunction with *Regulus*, *α Leonis*, just about the same time as it is in conjunction with the Sun.

Saturn is in a little better position, but is rather low down in the evening twilight after July. On July 1st it does not set until about 10:30 P. M., by August 1st it sets before 9 P. M., and on September 1st before 7 P. M. It reaches conjunction with the Sun on September 7th. Both *Jupiter* and *Saturn* are moving eastward and southward in *Leo*, but *Jupiter* is moving about twice as fast as *Saturn*. By the end of August *Jupiter* is about 13° west of *Saturn* and this distance will diminish to about 6° at the close of the year. *Jupiter* will pass *Saturn* during 1921.

Uranus is drawing nearer a favorable position for evening observation. On July 1st it rises about 10:30 P. M. and on August 31st at a little before sunset. It comes to opposition with the Sun on August 26th. It is in the constellation *Aquarius* and moves a little less than 2° westward and 1° southward during the two months. It is in a region of the sky quite barren of bright stars but the planet is not far from the fifth magnitude star *σ Aquarii* during the period, passing from a position 1° east of the star on July 1st to a point 1° west of the star on August 31st. The date of nearest approach is August 7th. The planet will then be about 30′ north of the star, or about the apparent diameter of the Sun or Moon. Under good weather conditions the planet can probably be identified.

Neptune is in conjunction with the Sun on August 3rd.